ABSTRACT

The present invention is generally directed towards a method for removing hydrocarbon contamination from a substrate prior to a nitridation step, therein providing for a generally uniform nitridation of the substrate. The method comprises placing the substrate in a process chamber and flowing an oxygen-source gas into the process chamber. A first plasma is formed in the process chamber for a first predetermined amount of time, wherein the hydrocarbons combine with one or more species of the oxygen-source gas in radical form to form product gases. The gases are removed from the process chamber and a nitrogen-source gas is flowed into the process chamber. A second plasma is then formed in the process chamber for a second predetermined amount of time, therein nitriding the substrate in a significantly uniform manner.